

Course unit title:	Calculus for Business and Social Sciences		
Course unit code:	AMAT106		
Type of course unit:	Required		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	1		
Semester when the unit is delivered:	2 (Spring)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr Petroula Mavrikiou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1) Understand the concept of the derivative of a function and be able to calculate the derivatives of polynomial, logarithmic and rational functions. 2) Apply differentiation for: sums, products, quotients, and the chain rule. 3) Calculate second order and higher derivatives. 4) Able to minimize and maximise functions with one variable. 5) Apply derivatives in optimization problems with emphasis in business problems (marginal cost, marginal revenue, and marginal profit). 6) Maximization of profit and minimization of cost. 7) Break even points. 8) Graph the Revenue function and Cost function. Shade the Profit region and Loss region. 9) Calculate the partial derivatives of functions of two or more variables 10) Apply partial derivatives of functions of two or more variables for the calculation of the maxima and minima of optimization problems. 11) Understand, apply and interpret the Lagrange multipliers method for constrained optimization. 12) Understand the models of exponential growth and decay problems with emphasis to business applications 13) Understand the concept of the indefinite and definite integral. Integrate simple functions and apply integral calculus in business problems. 		
Mode of delivery:	Face-to-face		
Prerequisites:	AMAT110	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> • The Derivative Functions, limits, continuity. The concept of the derivative of a function. Derivatives of polynomial, logarithmic and rational functions. Derivatives of the sum, product and quotient. The chain rule. Derivatives of logarithmic and exponential functions. Higher order derivatives (second, third etc). • Graphs and optimisation Minimization and maximisation of a function using the second order derivative criterion. Applications of derivatives in optimization problems with emphasis in business problems. • Applications in Business problems with one variable Apply derivatives in optimization problems with emphasis in business problems (marginal cost, marginal revenue, and marginal profit). Maximization of profit and minimization of cost. Break even points. Graphical representation of the Revenue function and Cost function. Profit and Loss region. • Multivariate Calculus-Functions of two variables Functions of two or more variables. Maxima-minima. Application in business problems (marginal cost, marginal revenue, marginal profit, exact cost, maximum profit and minimum cost). • The Lagrange multipliers method. The Lagrange method and applications in business problems. Further applications. Exponential growth and decay problems with emphasis to business applications. 		

	<ul style="list-style-type: none"> • Anti-derivatives and Integrals. <p>The concept of anti-derivative. Indefinite and definite integral of simple functions. The fundamental theorem of calculus. Applications in business problems.</p>
Recommended and/or required reading:	Notes and exercises given by the instructor.
Textbooks:	Barnett R., Ziegler M., Byleen K., College Mathematics for Business, Economics, Life Sciences and Social Sciences . Pearson Prentice Hall 2008.
References:	Anton, H., and Kolman, A., Mathematics with Applications for the Management, Life and Social Sciences , Wiley, 2002.
Planned learning activities and teaching methods:	The course is delivered to the students by means of lectures, and tutorials. Lecture notes are available through the e-learning platform of the University, and the instructor's webpage. Students are strongly encouraged for class work, problem and exercise solving and discussion.
Assessment methods and criteria:	<ul style="list-style-type: none"> • Test 1 20% • Test 2 20% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No